

Attorney's Docket: 2002DE312  
Serial No.: 10/659,600  
Art Unit: 1764  
Response to Final Rejection Mailed December 6, 2005

### REMARKS/ARGUMENTS

The Office Action mailed December 6, 2005 has been carefully considered together with each of the references cited therein. The amendments and remarks presented herein are believed to be fully responsive to the Office Action. Accordingly, reconsideration of the present Application in view of the following remarks is respectfully requested.

Applicant has amended the Application to attend to housekeeping matters and to more clearly describe the invention. Claim 1 was amended to more clearly recite that the hydrodechlorination process is performed in a single reactor and consists of reacting hydrogen with a nuclear-chlorinated o-xylene or mixtures of nuclear-chlorinated o-xlenes in the gas phase in the presence of a noble-metal-containing catalyst to provide a reactor effluent comprising at least 90 wt-% yield of o-xylene. Support for the amendment to claim 1 may be found in originally filed claim 1 and in Applicant's Specification in paragraphs [00013] and Example 1 at paragraph [00024]. Claims 2 and 3 was amended to more clearly recite that the noble-metal-containing catalyst comprised a noble metal disposed on a support material and that noble metal was palladium or platinum, or mixtures thereof and that the support material was an oxidic material. Support for the amendments to claims 2 and 3 may be found in originally filed claims 2 and 3. Claims 4, 5, 6 and 8 were amended to attend to formal issues in reciting that the ratio of hydrogen to reactant; reciting the term nuclear-chlorinated o-xylene, and properly referring to the term "hydrodechlorinating". Support for amendments to claims 4-6 and 8 may be found in originally filed claims 4-6 and 8, and in Applicant's Specification at paragraphs [00014] and [00018]. Claims 7, 9-10 and 12 were amended to attend to formal issues and to properly recite ranges over which to practice the invention. Support for the amendments to claims 7, 9-10 and 12 may be found in originally filed claims 7, 9-10 and 11, and in paragraphs [00015]-[00017]. New claims 17-20 are supported by originally filed claims 1-4 and by Applicant's Specification at paragraphs [00014]-[00017], and Example 1 in paragraph [00024]. It is not believed

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that any new matter was introduced by these amendments, and that no additional search is required by the office.

Claims 1-17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Zorn et al. (US 3,493,626). The rejection of claim 1 under 35 U.S.C. 103(a) as being unpatentable over Zorn et al. (US 3,493,626) (hereinafter referred to as Zorn) should be withdrawn for the reason that Zorn teaches away from Applicant's invention and for the reason that the catalytic arts are unpredictable.

Zorn relates to a method for the hydrodechlorination of mixed nuclear mono-chlorinated m-xlenes. Zorn discloses a two-stage process for the hydrodechlorination of mixtures of 2-chloro-m-xylene and 4-chloro-m-xylene. In column 1, lines 40 to 55, Zorn discloses that was not possible to carry out the hydrodechlorination of mixed chlorinated m-xlenes in a single stage process. To solve the problem, Zorn discloses a two-stage process, wherein the mixture of nuclear mono-chlorinated m-xlenes is first contacted with a non-noble metal catalyst comprising nickel or cobalt, or mixtures thereof to hydrodechlorinate the 4-chloro-m-xylene; and, following separation by distillation, the remaining 2-chloro-m-xylene is passed to a second stage reactor containing a noble metal catalyst for the separate conversion of the 2-chloro-m-xylene species to m-xylene (See Column 1 lines 45-53 and Examples 1-3 in column 2.). Thus, the hydrodechlorination process of Zorn as disclosed in the reference is a two-stage catalytic process which employs a first stage catalyst comprising a non-noble metal and a second stage catalyst comprising a noble metal, and further requires an intermediate separation step.

Applicant's invention relates to the problem of hydrodechlorination of nuclear mono- and poly-chlorinated o-xylene. Applicant discovered a method for the hydrodechlorination of nuclear mono- and poly-chlorinated o-xylene in a single-stage gas phase reaction in the presence of a noble metal catalyst to provide a hydrodechlorinated o-xylene product. Applicant's invention differs from Zorn in the following ways:

- a)      Applicant's invention relates to hydrodechlorination of nuclear mono- and polychlorinated **o-xylene**: Zorn only discloses hydrodechlorination of mono-chlorinated **m-xylene**.

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- b) Applicant's invention employs a **single reaction stage** and does not require any intermediate stage separation. **Zorn teaches away from a single stage process** by requiring two separate reactor stages and **uses a different catalyst system for each reactor stage.**

Catalyst activity is unpredictable, and modest changes in catalyst composition and/or the feedstock treated in a catalytic process can have a profound and unpredictable effects on the results obtained. This recognition of unpredictable catalyst behavior is well accepted in the catalyst art. Catalytic systems involve a high order of unpredictability. Since the manner in which catalysts operate is not fully understood, it is almost impossible to predict whether a given material will function as a catalyst without trial. Any rejection on this ground cannot be sustained. Even a minor change may produce a patentable invention where the result could not have been predicted beforehand by one skilled in the art.

One of the more difficult aspects of resolving questions of non-obviousness is the necessity to guard against slipping into use of hindsight. Many inventions may seem obvious to everyone after they have been made. However 35 USC 103 instructs us to inquire whether the claimed invention would have been obvious at the time of the invention was made to a person having ordinary skill in the art to which the subject matter pertains. In light of Applicant's evidence (See Applicant's Examples 1-3 in paragraphs [00024] to [00030] wherein mono-chlorinated o-xlenes, and mixtures of mono and polychlorinated o-xlenes are hydrodechlorinated to provide yields in excess of 90 percent producing o-xylene in a purity of 98 percent or better.), the argument that a chemist of ordinary skill in the art would have recognized a connection between a catalyst of the prior art and a different chemical species, being unsupported by objective evidence of record, fails to establish a prima facie case of obviousness.

The citation of cases such as *In re Dillon* 16 USPQ 2<sup>nd</sup> 1897 1904 (Fed. Cir. 1990); *In re Payne* 203 USPQ 245 (CCPA 1979), etc., and the statement that "It has been established that closely related homologs, analogs and isomers in chemistry

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may create a *prima facie* case of obviousness, fails to recognize the significant difference between these cases and the instant invention. For example, *In re Dillion* and *In re Payne* relate to a physical property which a specific chemical, or a homolog or an analog may possess such as an ability to reduce particulate emissions from diesel oils or a degree pesticide activity. However, none of these cases relate to the reaction of a different chemical structure in a catalytic chemical reaction. Catalytic reactions by their nature are well established to be unpredictable. Furthermore, Applicant has shown that contrary to the prior art of Zorn, a direct hydrodechlorination reaction can be successfully carried out in a single reactor on a different isomer to provide a yield of *o*-xylene of greater than 90 percent. Therefore, any rejection of claim 1 in view of as *In re Dillon* 16 USPQ 2<sup>nd</sup> 1897 1904 (Fed. Cir. 1990); *In re Payne* 203 USPQ 245 (CCPA 1979), etc. is improper and should be withdrawn.

A sustainable case of obviousness requires the prior art to provide motivation to one with ordinary skill in the art to arrive at the claimed invention. Here such motivation is absent. Furthermore, the prior art does not present to the ordinary artisan a reasonable expectation of success that the modification advanced by the Office would yield.

Still further, Zorn teaches away from Applicant's single stage approach with specific requirements for a multi-stage, multi-catalyst approach, with inter-stage separation.

Therefore, the rejection of claim 1, as amended, under 35 U.S.C. 103(a) as being unpatentable over Zorn et al. (US 3,493,626) should be withdrawn for the reason that Zorn teaches away from Applicant's invention and for the reason that no one skilled in the art would be motivated or expect that the catalyst disclosed in Zorn which Zorn limited to one species of mono-chlorinated **m-xylene** would provide the benefits of Applicant's invention for the single stage hydrodechlorination of both mono and poly chlorinated **o-xylene**, which is different from **m-xylene**. Obvious-to-try is not the same as obviousness under 103.

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The rejection of claim 2-17 under 35 U.S.C. 103(a) as being unpatentable in view of Zorn et al. (US 3,493,626) should be withdrawn for the reasons given in support of amended claim 1 from which they depend.

Claims 18-20 should be allowable for the reasons given hereinabove in support of amended claim 1 and 17 from which they depend.

It is respectfully submitted that, in view of the above remarks, the rejections under 35 U.S.C §103 should be withdrawn and that this application is in a condition for an allowance of all pending claims. Accordingly, favorable reconsideration and an allowance of all pending claims are courteously solicited.

An early and favorable action is courteously solicited.

Respectfully submitted,



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